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MACHINE TOOLS AND METALWORKING EQUIPMENT

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JPRS-UMM-84-001

31 January 1984

USSR REPORT

MACHINE TOOLS AND METALWORKING EQUIPMENT

CONTENTS

INDUSTRY PLANNING AND ECONOMICS

UDC 621.9.06:629.113.002

MODERNIZATION OF AUTOMOBILE PRODUCTION LINES REVIEWED

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 8, Aug 83 pp 1-3

[Article by A. S. Yevseyev, V. I. Gladkov, V. F. Rzhevskiy, Yu. S. Temirov: "Specialized Departmental Machine Tool Building -- Most Important Means for Raising the Efficiency and Quality of Automobile Equipment." Ministry of Automotive Industry, NIITavtoprom]

[Text] The successful solution of problems of raising the efficiency of production and the quality of products in the 11th Five-Year Plan period, posed by the 26th party congress for the automotive industry, depends on many factors, including the level of equipment at the enterprises. This, in its turn, is determined not so much and not only by the rate of increasing new capacities, but mainly by the rate and level of improved technology and organizing existing production facilities by reequipping them with modern progressive types of technological equipment. Meanwhile, increasing requirements in the automobile sector for special progressive equipment are not being met fully by machine-building ministries and frequently there are cases when the supplied equipment does not meet technical requirements with respect to accuracy, productivity and degree of automation. All this compels Minavtoprom [Ministry of Automotive Industry] enterprises to organize their development and manufacture by using their own forces.

Accumulated experience in this new field of production for our sector attests to the fact that such an approach is justified. This, in particular, demonstrates the considerable increase in existing and new capacities being put in operation to manufacture special technological equipment and the increase in the output of the latter. Thus, as compared to 1976, in 1982 the volume of its production increased eight-fold which made possible a sharp increase in progressive technological equipment in the sector's plants. For example, during that period, problems were solved comprehensively of supplying painting, welding, assembling and plating equipment for the Krasnoyarsk Automobile Trailers Plant, The Orsk Tractor Trailers Plant and the Neftekamsk Dump Truck Plant; thermal equipment and presses for the powder metallurgical shop of the Dmitrovgrad Automobile Plant imeni 50-letiya SSSR; welding equipment for the production of VAZ-2121 automobiles at the Volga Automobile Plant imeni 50-letiya SSSR and ZAZ automobiles at the Zaporozhsk "Kommunar" Automobile Plant. The first automatic molding line was manufactured for VAZ and production of lines for cast iron foundries was begun. The "GAZ" and BelavtoMAZ associations

assimilated the production of 100 to 200 kiloneuton sheet-stamping machines, while at VAZ special turning single and double-spindle multicutter automatic machines, incorporated in automatic lines, were assimilated; and at the Kurgansk Plant of Wheel Tractors imeni D. M. Karbyshev and the Shadrinsk Automobile Plant -- chemical-thermal equipment was assimilated; at the Zaporozhsk Automobile Plant imeni 50-letiya SSR and the GAZ Plant -- rotary-molding and core making machines; at the VAZ, Zaporozhsk "Kommunar" Automobile Plant and at the Zaporozhsk Planning-Design and Technological Institute -- multipoint welding machines for body parts of automobiles; at the VAZ and KamAZ [Kama Automobile Plant] -- fitting-assembling electropneumatic tools were assimilated in production, etc.

The capacities created in this sector are used primarily to manufacture types of special technological equipment which make possible a considerable reduction in energy consumption in basic production in the number of work positions and to save considerable amounts of metal (for example, since 1981, the production of the following was organized: mills for cross-wedge rolling, automatic lines for cutting out and punching shaped intermediate products from rolls, equipped with 500 kiloneuton presses, etc.)

A special feature in developing and introducing into production special equipment for the purposes of the sector is development according to plan. Head organizations in the sector are selected to organize the design and manufacture of equipment which determine the types of equipment and their requirements in the planned and long-range periods; to develop proposals for its specialization; to design and manufacture prototypes and supply technical documentation to the plants in the sector for series production; they supervise the technical level and quality of the manufactured equipment.

The overall coordination of the work in the sector on determining the types of the designed and manufactured technological equipment, the development of general sector technical specifications and RTM [Guiding Technical Materials], as well as monitoring the technical level of the equipment were entrusted to the NIITavtoprom [Scientific Research Institute of Technology of Automotive Industry].

To organize the production of special progressive equipment on tight schedules and at a level of the best world analogs, scientific technological cooperation was developed and is continuing to develop with CMEA members, leading machine building tool plants of the Minstankoprom [Ministry of Machine Tool and Tool Building Industry] and machine tool building firms in industrially developed countries. Thus, at present, close contacts have been established with enterprises in the Polish People's Republic which produce painting and thermal equipment; enterprises in the German Democratic Republic which produce devices for regulating and monitoring thermal processes; organizations and enterprises in the People's Republic of Bulgaria which manufacture automatic machining lines, as well as assembly lines using modular units; ChSSR enterprises that manufacture TVCh [High Frequency Current] installations for welding soft upholstery of body parts. Licenses were bought from the firm of "Aida" (Japan) and sheet-stamping equipment was assimilated in a short time; mechanized pneumatic tools from the "BOSh" Firm (FRG); standardized unit-head

machine tools and machining automatic lines from the "Khyuller" Firm (FRG), hydraulic-copying lathe saddles, from the "Zauter" Firm (FRG), monitoring-regulating hydraulic apparatus from the "Rekspot" Firm (FRG), production of high strength cast iron for housing parts of equipment from the "Mikhenite" Firm (England), etc.

The technical level of equipment produced by the plants of the sector was demonstrated at the USSR VDNKh -- at the interindustrial specific topic exhibit "Special technological equipment, manufactured by machinebuilding sectors," in July-October 1982.

The exhibit showed that most of the specimens of the equipment manufactured in the sector were made at the level of the best world analogs and were evaluated highly by specialists. For example, the following complicated and highly precise equipment was in great demand: facing automatic lathes, automatic presses for powder metallurgy, universal multicarrier bending automatic machine tools, automatic machines for surface-plastic deformation of solids of revolution types of parts, turning, grinding and superfinish machine tools for manufacturing bearings, etc.

In general terms, such are the results achieved in the development of our own machine tool building in the sector achieved in the 10th Five-Year Plan and the first years of the 11th Five-Year Plan periods. Still greater problems must also be solved in the very near future.

The basic one is the concentration of the efforts of the design and technological subdivisions of plants and institutes in the sector on efficient reequipment taking into account achievements of world automobile building. Among the main directions in solving this problem are the manufacture of automatic lines for their own comprehensive projects, consisting of units and machine tools of their own manufacture, as well as for projects and of machine tools made by the Minstankoprom enterprises; assimilation of the production of welding robots and creating, on the basis of these robots, flexible automatic integrated welding sets and sections; creation of highly productive automatic integrated sets for sheet stamping and foundry production facilities, assembly and transport-warehousing operations that provide the possibility for a sharp reduction in the number of workers occupied in such operations; the wide use of automatic systems for equipment control and automatic sets using microprocessor equipment.

The attention given to this direction in the sector is attested to, for example, by such a fact. In the 11th Five-Year Plan period, using its own machine tool building forces according to the accepted types for automobile building, the following must be assimilated for production: complicated robots for arc and point welding, articulated balanced manipulators and pneumatic robots which will be an important premise for their wide use at enterprises of the sector and, as a consequence, increase the productivity of the equipment further and free workers from difficult and monotonous technological operations. Because of this, this sector has, first of all, the possibility of achieving a new in principle level of automating technological equipment and processes and production facilities by using microprocessor equipment.

Microprocessors are becoming a base for changing over from the automation of individual operations and sections to the automation of technological complexes, shops and enterprises. Moreover, microprocessor equipment not only expands the functional possibilities of technological equipment, but also increases its reliability, reduces the amount of material used, the labor-intensiveness of manufacturing and the amount of power consumed.

Work is already being done on changing over the control system for the manufactured equipment to microprocessor equipment. To solve this problem more rapidly, it is planned to organize lectures at the institute to increase the skills of engineers and technicians of the Minavtoprom according to a special program. Also of great importance in providing high quality automated equipment being created is a well-thought-out system for its thorough testing when being developed and put into production. The situation is that the labor-intensiveness of tests increases sharply with the greater complexity of the product and, in some cases, it may amount to 30 percent of the total labor-intensiveness of product manufacture. This is why special importance is given to automating tests and the diagnostics of the condition of complicated equipment on the basis of mathematical methods for planning experiments and using modern microprocessor measuring-computer sets.

As a whole, it should be noted that specialists in the sector involved in the problems of building machine tools with its own forces see the most important direction as the one that will provide an effective saving in labor and material resources, in a systematic, technically and economically substantiated use of microelectronic and microprocessor equipment, and the wide introduction, on its basis, of robots and automation of production.

To create a single system to prepare for the production of machine tools with its own forces and raising the technical standard of the equipment manufactured by the Minavtoprom a set of industrial standards for the development and introduction of technological equipment in production for use in the sector was approved in 1982. It includes the following:

OST37.002.0620-82 "System for developing and placing in production technological equipment for use in the sector," which sets the basic conditions for the development, coordination, expert examination and approval of design documentation, testing of experimental specimens (experimental lots) and putting special technological equipment in production. The standard is applicable to special technological equipment and its components intended for series, as well as unit production;

OST37.002.0621-82 "Technological equipment. General technical requirements." It sets specifications for the technological equipment, its special design features, suitability for industrial production, the material and components used in its manufacture, and standardization; lays down specifications for the quality of castings and forgings, lubrication systems, hydraulic and pneumatic equipment, etc., as well as safety and production hygiene;

OST37.002.0946-82 "Provision of technological discipline in producing technological equipment." It sets the basic requirements for the organization of verifying existing technological processes, as well as the responsibility of officials for the observance of technological discipline.

The order for developing and introducing technological equipment in production fixed by the set of standards is directed toward the creation of equipment whose technical economic indicators meet the highest achievements of domestic and foreign science and technology and are at the level of the best domestic and foreign specimens, and creates premises for carrying out a single technological policy in the area of the technological equipment of the sector.

The list of equipment and the volumes of production, according to the specialization in the enterprises of the sector were determined for the 11th Five-Year Plan period. For example, during that period, there will be manufactured over 200 automatic machining lines, over 2000 robots for various purposes, 6500 special and unit-head machine tools, 4000 special forging-press equipment; production will be assimilated and output begun of heavy 400, 600 and 1000 kiloneuton presses; series production began of automated warehousing sets with stacker cranes; capacities created and output assimilated of electronic systems for controlling technological equipment which use microprocessors; the production of lines for cutting out rolled stock was organized. Special capacities were created at plants for manufacturing equipment, as well as special design-technological subdivisions for machine tool building; it is planned to use widely machine tools with ChPU [Numerical Control] for machining the most precise and labor-intensive parts; there are quality control and metrological services for the manufactured equipments and its testing under load conditions. The plans for plant modernization in the sector specify the creation of specialized capacities for manufacturing special technological equipment, as well as equipping the basic and auxiliary shops with equipment manufactured in the system of machine tool building by its own forces.

It is also planned to increase design and production capacities for developing the main directions of building machine tools with its own forces for long-range purposes. In particular, it is planned to create specialized capacities to produce technological equipment that would meet the requirements of the automobile industry with respect to accuracy, productivity, degree of automation and being provided with monitoring and controlling devices. Other ministries and departments must provide great help to Minavtoprom in this matter. Primarily, this help should be in providing a number of progressive components, including master controllers, machine tools with ChPU that are high speed and highly accurate in positioning, high torque electric motors and drives with flat rotors, pneumatic and hydraulic apparatus for machine tools, etc.

To equip bases for building machine tools in the sector with its own forces requires special design equipment and equipment for finishing, and sections equipped with processing centers controlled by computers which make it possible to meet the rigid requirements of the machining of parts of machine tools, automatic lines and robots.

The more efficient development of manufacturing progressive technological equipment in machinebuilding sectors requires considerable expansion of cooperation (on the basis of interministry cooperation), as well as implementation by GKNT [State Committee of the USSR Council of Ministers on Science

and Technology] of the coordination of the development of principal types of new technological equipment and automatic complexes.

Providing automobile production facilities with modern high productivity equipment that would determine technical progress further in the development of technology was and remains the most important national economic problem. It must be solved by collectives of enterprises, scientific research and technological design organizations, solved in a manner required by the documents of the 26th party congress and the November (1982) Plenary Session of the CPSU Central Committee. Using the accumulated experience, enterprises and organization of the sector must direct all their efforts toward an engineering search for solutions that will provide for creating progressive technological equipment for power saving, low waste or waste-free technologies that reduce material consumption and raise the quality of the automobiles produced.

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EXHIBITION FOCUSES ON SUCCESS OF CENTRAL QUALITY CONTROL SYSTEM

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVA in Russian No 7, Jul 83 pp 36-38

[Article by Ye. T. Larina: "Leningrad Enterprises and Organizations Struggle to Improve Production Efficiency and Work Quality"]

[Text] An exhibit opened this march at the "Standards" pavilion at the USSR Exhibit of National Economic Achievements familiarized us with leading experience in improving production efficiency and work quality at industrial enterprises, scientific research institutes and planning-design organizations, and in territorial management agencies of Leningrad and Leningrad Oblast.

About 500 exhibits were displayed by 160 production associations, enterprises and organizations.

The Leningrad territorial quality control system (LTS UKP), given a separate section at the exhibit, is an aggregate of organizational, scientific-technical and economic means and methods ensuring coordinated actions directed towards improving output quality.

A quality control and standardization section of the Economic and Social Development Council attached to the Leningrad CPSU obkom exercises overall leadership and coordination of all work in the LTS UKP.

Introduction of the LTS UKP significantly increased enterprise and organization work on developing and perfecting comprehensive quality control systems. The LTS UKP has been in operation since 1976; during that time, the number of items with the state Badge of Quality has risen more than 1.7-fold. As a result of persistent work on improving the efficiency of the LTS UKP, the proportion of output in the higher quality category in Leningrad and Leningrad Oblast industry has increased from 33 to 36 percent of the total amount of output subject to certification during the [first] two years of the 11th Five-Year Plan.

The annual economic impact of introducing the LTS UKP has been three million rubles.

The 26th CPSU Congress set the party and the Soviet people major tasks of further developing economy and improving production efficiency. We plan in the

1980's to complete the changeover of branches of material production to a basically intensive path of development.

The special exhibit section told of the leadership role of the Leningrad party organization in resolving the economic and social development tasks of Leningrad and Leningrad Oblast. Following the example of Leningrad's Moskovskiy Rayon [Moscow region], which first worked out and introduced a rayon quality control system, we can familiarize ourselves with their action.

The system's operation is headed by the Economic and Social Development Council attached to the raykom. Introduction of the rayon quality control system has facilitated an increase in the proportion of output in the highest quality category to 33.2 percent during the 10th Five-Year Plan; this figure will reach 38.1 percent by 1983. Items with the state Badge of Quality are produced by 19 of the 22 enterprises producing certified output. In 1979, the rayon introduced a comprehensive system of efficiency and quality control at motor-transport enterprises.

The task of improving product quality is being resolved in close conjunction with production intensification, accelerated scientific-technical progress and increased labor productivity. The entire increment in production volume in rayon industry during the [first] two years of the 11th Five-Year Plan was obtained thanks to labor productivity growth.

Rayon industrial enterprises have introduced 38 fully-mechanized and automated lines, comprehensively mechanized 58 shops and sectors, mastered 285 modern technological processes, and introduced 332 pieces of highly productive equipment, including 50 NC machine tools.

Rayon enterprises participate actively in actualizing the "Energiya" and "Metall" regional comprehensive target programs for saving fuel-energy material resources and improving energy- and materials-intensive technological processes which were developed on the initiative and under the leadership of the Leningrad obkom.

The "Energiya" [Energy] program, persuasively presented at the exhibit, encompasses 38 rayons of Leningrad and Leningrad Oblast; 40 scientific research and planning-design institutes participated in its development.

Lead organizations of 12 subbranches participating in implementing the Leningrad "Energiya" branch program have developed low-waste and energy-conserving technologies which have ensured a savings of more than 1.5 million tons of conventional fuel, for all types of energy resources, during the first two years of the 11th Five-Year Plan.

City and oblast enterprises and organizations are saving upwards of a billion kilowatt-hours of electricity, two million kilocalories of thermal energy and 300,000 tons of conventional fuel annually.

The most important territorial target programs which were explained in detail at the exhibit booths have been included in the five-year plan for the comprehensive economic and social development of Leningrad and the oblast. These include, for example, a program for reducing manual labor, encompassing the operation of 390 industrial enterprises and organizations. Its implementation will permit an

18.5 percent reduction in the proportion of manual labor, transferring upwards of 40,000 persons from manual to mechanized, and a reduction of 5,639 in the number of people employed at hard manual labor. The economic impact of implementing this program will be 256 million rubles.

A number of the largest Leningrad enterprises demonstrated their successes in introducing comprehensive quality control systems at the exhibit. The facts and figures showed how much their collectives have done to carry out these very important party resolutions.

Thus, the "Elektrosila" LPEO anticipates a comprehensive quality control system to control the technical level and quality of items at all stages, from development to state certification. The primary condition in this respect is that high quality and a corresponding technical level must distinguish the very first models of a new piece of equipment. This is expressed in the slogan: "State Badge of Quality for Each New Item," under which socialist competition has been developed in the association. As a result, the release of output in the highest quality category comprised 81.5 percent of all commodity output subject to certification during the last five-year plan. And the annual increment in output in the highest quality category has been more than seven million rubles.

The thrice Order of Lenin Leningrad Optical-Mechanics Association imeni V. I. Lenin (LOMO) shared its experience in introducing leading methods of production management in combination with the development of a comprehensive work quality control system (KS UKR).

During 1982, labor productivity at the association increased 11.5 percent, given an annual release of 700 different items. The proportion of output in the highest quality category increased to 70.6 percent of the output subject to certification in 1982. The economic impact of introducing the KS UKR was about 250,000 rubles in 1982.

Association management organization was based on the extensive use of computers, providing an opportunity to shift to the shaping of an integrated automated control system (IASU). The annual economic impact of this was 1.4 million rubles.

Since 1962, a nationally known system of defect-free manufacturing (BIP) developed from the Saratov system has been in operation at the "Svetlana" LOEP [not further identified]; the planned development of a KS UKP [comprehensive product quality control system] was begun in 1976, and the first line of that system was put into operation in 1978.

The KS UKP system created at the association is an aggregate of interconnected normatives, methods and means of control aimed at setting up planned association activity in establishing, maintaining and systematically raising the level of product quality.

In 1980, the "Svetlana" association put the second line of the KS UKP into operation. In order to increase the efficiency with which the growing volume of information generated in this connection concerning labor and product quality is processed, an automated quality control system (ASUK) was developed and introduced. The exhibit stands, charts and displays familiarized one in detail with

how tasks are being resolved within the ASUK framework as an integral part of an automated association control system (ASUO).

As a result of the introduction of a KS UKP, the proportion of output in the highest quality category has been 47.7 percent of the total output volume subject to certification.

At the "Leningradskiy elektromekhanicheskiy zavod" production association, the comprehensive product quality control system introduced in 1978 was aimed at resolving one basic task, that of improving product quality. In order to reduce the time involved in developing new items and to improve the technological preparation of production, a complex of exterprise standards was introduced concerning moral and material incentives for labor and product quality. A combination of personal and collective responsibility for work done, that is, implementation of the slogan: "From High Individual Work Quality To More Effective Collective Labor," provided the association an opportunity to achieve impressive results. The proportion of output with the state Badge of Quality increased from 4.3 percent in 1976 to 62 percent in 1982. The time involved in developing new items and putting them into production was reduced 1.4-fold.

Leningraders also shared at the exhibit their experience in territorial certification of the organizational-technical level of production. In 1982, certification was done at nine of the largest associations. The organizational-technical level of production includes level of product quality and production and technology organization. Levels are evaluated by analogy with the certification of industrial output, using three categories: highest, first and second.

The LTS UKP attaches great importance to metrological support. Important work is being done under the slogan: "Exemplary Metrological Support for Leningrad Industry" by oblast and city party organizations.

The exhibit emphasized (and illustrated with examples) that improvements in metrological support are being developed most successfully where the necessary contact exists between production and scientific metrological organizations.

The exhibits extensively elaborated the history of the development of socialist competition in the collectives of Leningrad enterprises, as well as new forms of such competition and initiatives on it. Thus, the collective at the "Elektrosila" association assumed an obligation to provide the entire increment in output this five-year plan without increasing rolled metal expenditures; the collectives of the plant imeni A. A. Zhdanov and the Scientific-Production Association for Power Equipment Research and Design imeni Polzunov promoted an initiative to provide the entire increment in industrial output volume and scientific research in the 11th Five-Year Plan with an actual reduction in the number of workers.

The initiative put forward several years ago by collectives at the Optical-Mechanical Association imeni V. I. Lenin, the "Svetlana" production association and the "Pozitron" scientific-production association on reducing the "research - introduction" cycle was further developed.

"Ritm" scientific-production association developed a program for creating and introducing robot-engineering complexes in the 11th Five-Year Plan, which is to

increase labor productivity three- to four-fold. The robot-technological assembly complex discussed at the exhibit will yield an annual economic impact of 45,000 rubles. Association output was also presented. Colorful display stands familiarized visitors with a program for creating robot-technological complexes at shipbuilding enterprises of Leningrad and the oblast.

There were various exhibits displayed: machines, assembly line models, devices, and so on, all developed and introduced at Leningrad enterprises.

The exhibit confirms the successful resolution of the most important national economic tasks by Leningrad enterprises.

11052
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LOW CAPACITY UTILIZATION IN BELORUSSIAN MACHINE TOOL INDUSTRY CITED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 8, Aug 83 pp 70-73

[Article by I. Arbuzov, department chief, USSR Gosplan, P. Kotyayev, subdepartment chief, USSR Gosplan, V. Pervyshin, economist: "Production Capacities -- Full Loading"]

[Text] Our country has great economic potential. At present, the total cost of fixed production capital exceeds 1.3 trillion rubles. The output volume of the means of production and consumer products, and the maximum satisfaction of material and cultural requirements of society depend on how fully and efficiently the created potential is utilized.

The course taken by the party of intensifying social production, obtaining the greatest yield from available and newly created industrial potential is one of the highest priority problems. Raising the yield of fixed production capital is of tremendous importance in the eighties. In fact, if it rises by only 1 percent, the country will receive about 5 billion rubles of additional national income.

An important role in accelerating the intensification of the economy is assigned to improving the utilization of production capacities of enterprises -- a component part of the national wealth of the country. The basic directions for economic and social development of the USSR for 1981-1985 and for the period of up to 1990 is to pay special attention to reducing the time for assimilating rated capacities, increasing the shift coefficient of machine and equipment operation, and replacing outdated equipment more rapidly.

An analysis of the operation of machinebuilding enterprises in 1982 indicates that the available potential is underutilized considerably. In the Minelektrotekhprom [Ministry of Electrical Equipment Industry], Minsel'khozmash [Ministry of Tractor and Agricultural Machine Building] and Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] a trend toward reducing the level of utilization of production capacity was noted. The shift coefficient of equipment operation in 11 machinebuilding ministries decreased from 1.43 in 1981 to 1.41 in 1982. In the Minelektrotekhprom and the Mintyazhmash [Ministry of Heavy and Transport Machine Building] it was 1.31 to 1.34.

To raise the utilization level of production capacities at existing, as well as in new enterprises, and to strengthen centralized planning influence, the USSR Gosplan implemented a number of measures that will make it possible to improve the situation. At present, together with the sector departments of the USSR Gosplan and ministries, planned balances and targets are being developed for the five-year period, and the loading of existing production capacities and up-to-date assimilation of new production capacities are monitored systematically.

The calculation of production capacities is an important component of the technical-economic substantiation of the industrial production plan. The volume of output of industrial products are set on the basis of the available equipment and the shift coefficient of its operation, technically substantiated machine productivity norms and the labor-intensiveness of the products manufactured in accordance with the product list and assortment. These calculations determine the expediency of increasing production capacities and the efficient reproduction of the capital investment structure. Experience of recent years shows that the most progressive and effective direction in developing production is reequipment.

Calculation data, taking into account progressive production technology and the scientific organization of labor, is used to prepare production capacity balances for the planned period at all management levels of industry. This data is utilized in recommendations on determining the requirements of additional equipment, identifying and eliminating production bottlenecks, the most effective direction of capital investments, developing measures on eliminating production, industrial and interindustrial disproportions, as well as developing industrial and interindustrial cooperation.

The monitoring of the utilization of production capacities is implemented by schedules approved by the USSR Gosplan and directly at enterprises of various industrial sectors. In 1982, the loading of capacities was verified at 8 enterprises of machinebuilding industries: The Sumsk Production Association imeni M. V. Frunze, the Kiev "Elektronmash" Production Association imeni V. I. Lenin, the Minsk Automatic Lines Plant imeni P. M. Masherov, the Moscow "Borets" Plant, the "Uralmash" Production Association, etc.

The verification methodology was developed as applied to a specific enterprise; however, the following criteria were used:

correspondence between production capacity balances for the period under consideration with calculations for their utilization in the planned year according to existing methodological documents;

composition, age structure and utilization of metal-working equipment, as well as the loading of special design equipment;

extent of provision of the enterprise with machine tool operators, labor turnover;

effectiveness of the reequipment plan and organizational-technical measures for eliminating bottlenecks;

labor-intensiveness of product manufacturing.

The following participated in the verification along with staff members of the USSR Gosplan: representatives of ministries, all-union industrial associations, design and leading scientific research institutes and NIIPiN [Scientific Research Institute of Planning and Norms] specialists at the USSR Gosplan. Special tables and questionnaires are being developed and sent to enterprises. The obtained materials are studied and preliminary conclusions are made on the utilization of production capacities. The equipment loading and assimilation levels of new capacities and the rated productivity of mechanized flow lines and automatic lines are determined in existing production facilities, and reserves are identified for increasing the output. After verification, proposals are developed for improving the loading of the production capacities and equipment, reducing the assimilation time of new capacities and utilizing reserves. Final conclusions and proposals, coordinated with the enterprises, are reported to the USSR Gosplan management and are sent to the ministry for taking the necessary measures.

Vertifications have shown that some enterprises do a great deal to improve the utilization of capacities. Organizational methodological development is implemented by especially created services -- bureaus or sectors of production capacities in departments (as a rule, of chief technologists). Those services analyze the equipment loading, develop and monitor the implementation of measures on its fuller utilization and elimination of bottlenecks. Special attention is given to insuring the full loading of metal-working equipment, especially of special design. The following organizations operate very efficiently: for example, the bureau of production capacities of the Minsk Automatic Lines Plant imeni P. M. Masherov and the Sumsk Production Association imeni M. V. Frunze.

In recent years, enterprises have devoted a great deal of attention to reequipment that would ensure an increase in production capacities. Thus, during the past 7 years, at the Moscow "Borets" Plant, capacities were increased by reequipment and by taking organizational-technical measures practically without expanding production areas. Production volume increased by 24 percent as a result.

At the same time, verification also exposed general shortcomings not only in calculations, but also in the actual utilization of production capacities. One shortcoming was excess equipment and, as a consequence, a shortage of machine tool operators. For example, in the "Elektronmash" Association, there are not enough operators to operate machine tools for even one shift. A similar situation is observed in the "Uralmash Production Association and the "Borets" Plant.

At all the enterprises checked, the equipment was very lightly loaded during the 24 hours. While about 80 percent of it operated in the first shift, less than half operated in the second and in the third shift, even the special design, high productivity equipment was not always utilized.

Idle times of the metal-working equipment are due basically to the machine tools being out of order or undergoing unplanned repairs. For these reasons, in 1977, the ratio of equipment standing idle an entire day at the "Elektronmash" Association was 4.5 percent, in 1980 -- 13.1 and in 1982 -- 19.3 percent. This increase is also due to a considerable share of physically wornout and outdated metal-cutting machine tools, high labor turnover, lax labor discipline and poor organization of production.

On the day of the check, there were found in the "Elektronmash" Production Association 5.6 percent idle metal-cutting machine tools and 8.1 percent of idle forging-press equipment. There were no calculations of production capacities for 1982; no data for recalculating the rated capacity for the actual output for the report year (1980); no list of equipment, not included in the calculation of capacity; no documents approving changes in the list of equipment and its assortment in 1981, etc. A huge amount of metal-cutting equipment stands idle in basic production shops. There are only 29 machine tool operators per each 100 machine tools. Obviously, the existing financial system of payment for fixed production capital (3 percent of its balance cost), essentially does not function, i.e., actually does not stimulate an enterprise to utilize machine tools and other equipment more fully. Enterprise managers do not carry responsibility for surplus equipment and keep it just in case. Thereby, they inflict considerable material damage on the state, since an active part of the means and labor tools is excluded from material production.

At the Minsk Plant of Automatic Lines imeni P. M. Masherov, 62 equipment units were not taken into account in calculating the production capacity for 1982. This led to overstating its utilization indicator and reducing the annual production volume by 40 metal-cutting machine tools and 2 sets of automatic lines. In spite of the fact that there are old machine tools in operation, a large number of new uninstalled equipment remains in the warehouse. The plan for capital repairs of machines is fulfilled by only 80 percent. Partial utilization of machines does not prevent the plant from fulfilling and overfulfilling the production plan. Meanwhile, there is an objective continuous connection between the past reified labor and live labor in their functioning. Only in such a case do machines, machine tools and equipment bring tangible benefits, otherwise they remain dead capital.

Proper ministry services monitor capacity loadings poorly at enterprises and do not create conditions to interest production people in their best utilization.

In this connection, of interest is the GDR experience where an effective form of influencing fuller utilization of equipment was found. So-called bureaus of production capital reserves function in large cities and industrial centers. They determine the degree of loading of machine tools and machines

at enterprises of their regions and provide to production collectives who need it ideas on time utilization of free machine hours. The loading of the machine tool park increased noticeably.

At the Moscow "Borets" Plant, the shift coefficient of metal-cutting machine tool operation at three basic shops was 0.89, which is two-thirds of the equipment shift coefficient established by the ministry, and half of that reported by the given enterprise. The basic production shops have 228 operators for 256 machine tools. Moreover, there are 10 mechanized flow lines which, obviously, are not loaded fully. For example, the rated productivity of the flow line for connecting rods is utilized only 34 percent, for crankshafts -- by 40, for frames -- by 47 percent, etc. Production capacity reserves is attested to by the amount of equipment not taken into account (about 43 percent) and used in auxiliary production of the plant. However, it is known that equipment installed in auxiliary shops above the norm and similar to that employed in the basic shops must be included in capacity calculations. As a result, 39 excessive metal-cutting machine tools with numerical control were identified.

Thus, verifications showed that in a number of enterprises, the number of installed machines is intentionally lowered and those installed in the last 2 to 3 years, or are in the warehouse, but are earmarked to be put in operation in the accounting period are not taken into account in order to improve the indicators of the utilization of production capacity and the shift coefficient of machine operation. This leads to the distortion of the actual shift coefficient of the equipment and creates not only an improper concept of the true situation in the industry, but also orients the managers of the industry toward making wrong decisions.

Calculations of production capacities must be directed, first of all, to raising the efficiency of production with specific proposals for eliminating bottlenecks, eliminating causes that hinder the efficient utilization of the equipment. Taking into account the shortage of skilled operators which is the basic limitation in the entire material production, it is necessary to turn special attention of managers of industrial sectors to constant, purposeful training of such operators. At the same time, there is also required the proportional equipping of plants with industrial robots, machine tools with ChPU and other progressive equipment.

2291
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SURVEY RESULTS OF INDUSTRIAL QUALITY CONTROL SYSTEM DISCUSSED

Moscoq PRAVDA in Russian 14 Sep 83 p 2

[Article by V. Belobragin, chief, State Inspection and Territorial Organs Administration, Gosstandart SSSR: "The Quality Controller Will Help"]

> [Text] Shop-floor quality controllers are often referred to as the "knights of quality". Sounds beautiful, but in all truth, these specialists (and there are over a million of them in industry) are hard put to it to display truly knightly behavior. It is not secret that many production leaders, from foreman to director, are so bent on "making the plan" at any price that they perceive controllers' recommendations as cavils and impediments.

Another thing that leaves much to be desired is the "knightly armor" of OTK [Department of Technical Control] workers--the tools they work with, the ways and means open to them in combatting defective output, and consequently, in influencing the organization of competition. Yet according to statistics, the quality of output is improving at a far slower pace than we would like it to.

There is no argument that the contestants do have some achievements to their credit--a number of products are today better and sturdier. In 1976-1982 the proportion of products rated top quality rose from 6.5% of total output to 15.3%, in machine building--from 18.5 to 38.6%. Nevertheless, a sharp rise in the quality of machines, instruments and consumer goods did not materialize, as the June (1983) Plenum of the CPSU Central Committee duly pointed out. Also cause for concern is the fact that only 18-20 percent of new products merit certification as top quality goods. A substantial part of the items now in the project-design stage reflects the science and technology of a time gone by.

Her is a typical example. Two years ago several enterprises of the tractor and agricultural machine-building industry mastered the production of 22 new machines, seven of which were singled out for certification as top quality products. In actual fact only one of them lived up to expectations. In 1982 the Ministry of Heavy and Transport Machine

Building organized the production of 30 new types of equipment at some of its plants, but only two were granted top quality status. Every year Gosstandart is forced to send back to the ministries for finishing and recertification about 200 State Certification Commission rulings granting top quality status and to strip no less than 400-500 products of the prestigious pentagonal logo.

Cases when labor competition participants disregard normal requirements and specifications and produce substandard goods have acquired a truly mass character. The causes, as established by spot checks, are many, and one of them is the liberal attitude of shop-floor controllers, a lack of insistence on their part that the rules of competition be strictly observed.

Measures to eliminate these shortcomings, to improve the work of the OTK at enterprises been undertaken. A standard quality control character was drawn up which was ratified by the USSR Council of Ministers in late 1979. The new charter grants much greater rights to the OTK's and increases their ersponsibility for the quality of industrial output. Over three years have elapsed since it went into force, but no substantial growth in the effectiveness of quality control has taken place.

Random checks have shown that almost every other plant of the ministries of the Machine Tool and Tool Building Industries, Chemical and Petroleum Machine Building, Construction, Road and Municipal Machine Building and Machine Building for Light and Food Industries and Household Appliances did not have the standard OTK charter at hand. At most enterprises norm setting for quality control operations is unsatisfactory. The OTK's of many plants do not take part in the collection, analysis and generalization of data on the operational and consumer parameters of their output, no systematic records are kept and no analyses conducted of losses arising from claims, reimbursements or discounts. In these conditions it is not easy to organize socialist competition aimed at improving quality indicators. A number of collectives have no measures planned to reduce defective output and do not research recurring flaws. Several ministries have only formally complied with the need to draw up sectorial OTK charters--most of the latter do not reflect the specific aspects of the industry concerned but repeat word for word the text of the standard charter. Many shop-floor controllers do not even know about their expanded powers, and in some cases are loath to burden themselves with additional responsibilities.

What do we have in mind? For example, the new charter empowers OTK workers to nofity Gosstandard organs and the procurator's office of the supplier's district about all incoming shipments of substandard raw materials and assembly units. Such steps would greatly help those competing for higher quality output. However, shop-floor controllers gave up to now almost never used this right.

Prior to the new charter OTK controlers manily assessed the quality of finished goods, now their "mandate" includes the entire process of an industrial product's development and application: from examination of the future machine's engineering project to the study of its operational modes and analysis of costomer claims and comments. As we can see, the range of problems subject to oversight by technical control specialists has been substantially enlarged. It is important for all OTK workers to master their new responsibilities as quickly as possible.

Help in this matter is to come from a Council of OTK Chiefs created over a year ago. Organized under the aegis of Gosstandart, this body meets quarterly to discuss pressing problems of heightening the effectiveness of technical control. Its memebership consists of the OTK chiefs of major enterprises and subdivision chiefs from the ministries and departments. Four of the six meetings already held by this public organ took place at enterprises that rank among the foremost in their field, but in the future the council intends to convene at plants that pay insufficient attention to problems of improving product quality control.

The council has discussed questions relating to the organizations at enterprises of quality control of incoming supplies and studied the results of putting the competitors on a self-control system. Every fifth enterprise was found to have a shortage of monitoring and testing equipment. Progressive non-destructive and statistical methods controlling and regulating technological processes are being introduced at a negligible rate. The level of mechanization and automation of OTK work is growing all too slowly.

There are, however, some practical achievements that can se-ve as a model. Thus, scores of mechanical robot-controllers have been put into operation in the timepiece industry thereby reducing the work-intensiveness of control operations by two to two and a half times. Implementation of minicomputers built into the equipment has also had a significant effect. This know-how could well be adopted by, say, the heavy machine building industry where obsolete methods are still the rule. To uncover typical defects in a batch of assemblies or parts every hundredth or even every tenth item is scrapped [for checking]. Such a "method" is not only costly, it is unreliable as well. Be that as it may, it is a familiar practice, whereas the introduction of non-destructive means of control requires a certain degree of effort.

A cause for concern is the shortage and low professional skills of controllers. Still unresolved is the question of classifying them as main production-line workers and of removing OTK engineers and technicians from the administrative personnel category. Without such a move OTK workers will as always be the first to suffer with every workforce reduction. It is now up to the State Committee for Labor to make the decision.

Furthermore, it is high time that the material incentive system for controllers be directly linked to their prime function--preventing the production of defective goods--and that they be rewarded not for quantative fulfillment of the plan, but for the quality of the plant's output.

The June plenum of the CPSU CC and the CPSU CC and USSR Council of Ministers decree "On measures to accelerate scientific and technological progress in the national economy" target all participants in socialist competition first and foremost at achieving high quality. It is a cause which controllers are called to spearhead by the very nature of their duties. Who better than they can provide concrete assistance in orienting the contestants toward improving the qualtiy of industrial output and reducing consumption of raw materials and energy?

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SKEWED PRIORITIES OF INDUSTRY MODERNIZATION PROGRAM CRITICIZED

Moscow IZVESTIYA in Russian 30 Jun 83 p 3

[Article by Anatoliy Agranovsky: "Pictures From an Exhibition"]

[Text] The exhibition opened in the outskirts of Moscow, in the industrial suburb of Karacharovo. It elicited deep interest. Deep, but not widespread. Visitors came singly and in groups, but they were all professionals in the field--plant directors, design engineers, scientists, ministers. The only non-professional there, if I am not mistaken, was myself.

What I saw were machine tools--lathes and milling machines. The difference was that they all were operated by ChPU [chislovoye programmnoye upravleniye]--numerical control. They performed computations and measurements, possessed a memory, were capable of self-instruction. I am certainly not reporting these facts because I wish to amaze the reader.

Amazing the reader would have been easy about a third of a century ago. In those days I got an assignment from a certain newspaper to write an article on the bourgeois pseudoscience of cybernetics. Professors, insisting quite scientifically that no machine was capable of "remembering" or "thinking," were not hard to find. Nevertheless, I did not write that article, knowing from experience, fortunately, that you have to hear the other side's story too. So I sought out another professor, a peevish old doctor of mathematics, and he told me: "Young man, bear this in mind: a machine can do anything. There is only one thing a machine cannot do--be a bastard."

If the machines I saw now could not do everything, they certainly could do a lot. They could turn cones and spheres and very difficult screwthreads. Theirs is not the stupidity of an imbecilic automatic machine which does one and the same thing ad infinitum. It does it unfailingly and fast, true and that's fine with large series, but these constitute only 25 percent of all production, the other 75 percent are small series and piecework.

As everybody understands, to undertake automation for the sake of a single part makes no sense. It is much simpler to have it made manually. But there was an unusual contest held recently: one and the same assignment was given to a top-rated turner and to a NC [numerically controlled] machine tool. The turner went to the task immediately and easily outstripped the NC machine tool which

its operator had to adjust, program, etc. Up to about ten details the turner was ahead, but then lagged hopelessly behind. These NC machine tools, while retaining their versatility, can automate small series. That is the second difference.

The worker here (and we must keep this in mind) is idle most of the time. He sets up a crude workpiece--and takes down a shining part. With one of the machine tools, by the way, he didn't have to do even that: it was equipped with a very simple robot-manipulator. Here all the third shift has to do is get together the required number of pieces, press a button and turn off the lights. The machine-tool will do the job overnight.

That's the kind of exhibition it is, and now you have every right to ask: what's so fundamentally new about it? The answer is: nothing. Perhaps the machine tools assembled here are the newest models? The answer is: They are at the very least 7-10 years old--and here you have the third difference. To invent something new is flattering, new construction projects are the talk of the country, they are efficient, but more efficient in our day and age is the reconstruction of old plants, a subject I have had occasion to write about. This time we will talk about the modernization of old machine-tools. The problem is gigantic.

What is the most widespread advertisement in our country? "Wanted...." Turners wanted, milling machine operators wanted--you can see them in every city, at every factory gate. But maybe it's time we stopped being touched by the shortage of workers. Maybe the time has come to speak of "unemployment" among machines.

The USSR Minstankoprom [USSR Ministry of the Machine Tool and Tool Building Industry] is next to IZVESTIYA, the next house down Gorkiy Street, in fact. The minister, B.V. Bal'mont, said: "You have presses standing idle in your printing shop too." "How do you know this, Boris Vladimirovich?" "Every day on my way to work I see "Wanted...." I'll be self-critical: I walked by them a hundred times, but got so accustomed to the sight that they never really registered.

One could, of course, look for the guilty party in every given case, but we have the overall figures and there's no way these can be relieved of their duties. According to the minister, there are several million metal-putting machine-tools in our country. The largest inventory in the world. But there are only 0.59 operators per machine tool. The shift coefficient is 1.29. In other words, they work, where they work at all, mostly one shift. That's one third of their potential.

The last all-union census of machine tools was in 1972. Machine tools are counted just as people are. Now and then raids are made on the negligent: a 24-hour observation on 19 May of last year revealed that at eleven machine-building ministries 257 thousand machine-tools were idle. So far they are not schooled in cussing, do not take smoke breaks, have no hangovers, but who knows? The possibilities of progress are truly limitless.

And what are our industrial managers doing about it? Building new plants without bringing order to those already there. Demanding new machines without

first providing their own with fuller workloads. And in the current 5-year plan only Minenergomash [USSR Ministry of Power Machine Building] has earmarked a reduction in equipment of 5153 units the other departments wish to "grow" come what may.

Idle machines aren't any better than idle workers. Worse. Somebody mined the ore, smelted the iron, founded the steel, hauled it over vast distances, metalworkers toiled and energy workers and builders and railwaymen, and all had to be fed, trained, given medical care--why, incorporated in these machines is a part of the toil of well nigh every one of us. Think, then, of all this embodied labor frozen. And you say somebody checked in 15 minutes late.

The exhibition in Karacharovo points the way to the solution of the problem. More precisely, to play it safe, to one of the ways. New methods of processing metals must be incorporated into production so that shavings don't have to be bothered with any more. A stop must be put to the current practice wherein every factory, every kolkhoz, every printing plant makes its own spare parts, splints, bolts. Their production must be centralized and serialized, thus furthering specialization. We know all that, we studied it in school. But implementing it is a slow business because of the huge capital investment involved.

What is now being offered, then, is not a panacea, it is yet another version, but an economic and achievable one. If there are few machine operators, then make multimachine operators out of them. In the weaving industry this method took root a long time ago, but turners and milling machine operators never mastered it. Now, though, we noted, the worker is free. He operates 2-3 numerically controlled machine-tools everywhere. And, more importantly, produces the highest quality. The precision of the metalworkers even in the hands of yesterday's schoolchildren, is a full class above the usual.

"We can quickly come up with a progressive inventory," minister B. V. Bal'mont said to me. Upgrade the machinery the country already has, that is, to conform to modern standards.

Machine tools, you should know, require capital repair anyway. After repair they can function a long time, except that besides physical wear there exists what is known as moral wear. This became especially obvious when new program machines came off the conveyer: we now produce over 10 thousand of these a year. So a daring idea came into being--simultaneously give the old machine tools a "higher education" at the time of repair.

The job was assigned to the "Soyuzstanokremnaladka" association. The director Yu P. Sagenyuk and chief engineer V. I. Tarnovsky asked me to write that no Americas were discovered. So I will pass over the phase of inevitable disagreements, first trials and errors, consulting scientists, defenses of the project and get straight down to the business at hand.

They preserved the old machine-tools--the economy here is understood. Out of its 1500 assemblies and parts about 200 have to be replaced. But those that stay, aren't they worse than new parts? Better, I was told. Having gone through the process of natural aging they acquire greater durability. For skeptics who

believe only in what has been tried somewhere else let me add this: there are companies in the U.S. that buy up old machine tools, equip them with numerical control and sell them at a handsome profit. Capitalists, you know, do not spend money foolishly.

The association has 10 small-size plants (500-600 employees each), but from the outset they demonstrated a solid approach to the work. The production of complicated "ball couples," for instance, was mastered for all its sister plants by "Mosremstanok"; I saw them being made, I even saw the finished products with the craftsmen's personal stamp. Oil pumps were mastered by the Sumy plant, clutches--by the Michurinsk plant, the Tula plant specialized in turrets....

This was no cottage industry, they were able to make these assemblies with the aid of those same programming devices, and as a result 80-100 renovated machine-tools of each model have already been produced, they're all doing their job at different plants. This is not a theoretical supposition, but a living truth. It is important for me to stress the fact because we have a lot of "experts" around who remind me of locksmith Poshlepkina's husband: that individual, as we all know, was decidedly good for nothing. They can talk on and on, they can explain anything, but when it comes to action they are gripped by paralysis. Here, though, these people got an assignment and carried it out without a hitch and dead on time.

The machines were not earmarked for exhibition. As a matter of fact, the exhibition itself originated by accident. Standard procedure called for samples to be presented to an interdepartmental commission, so they were all brought down to Moscow. Gathered together, they became a phenomenon you cannot now bypass or put on the back burner.

"People always shy away from the new," said Sergey Kostin. "But like it or not, they'll have to accept it."

He is a sturdy and well-proportioned young man, a hereditary worker, Tula born. From as far back as he can remember there was always plant in sight ("Like the subway with you," he said to me.) In the army, serving in the rocket forces, he was introduced to electronics, then worked as a milling machine operator, top class, at a plant, was sent to Leningrad to compete in an all-Union contest, came in fifth. He was, therefore, an accomplished craftsman when they offered him the job of adjuster of NC machine tools.

We hear about conservatism in science, but it exists in the working class too. Kostin was making up to 250 roubles a month, friends were saying "You have it good, why switch?" Also: "You'll go broke!" It looked like they were right--he was put on a monthly salary of 140 roubles, this with a baby son in the family.

Six months later, though, he was reassigned to piece-rate work and now makes a minimum of three hundred a month. All arguments ceased, and Kostin tends to be proud of being first in his field.

They have 20 programmed machine tools now and he adjusts them all by himself. The operators are young girls, and there is no turning away applicants. The program is fed into a Minpribor column (for those in the know: M22-1M). Nobody but Kostin has the right to probe this knee-high grey box. He is mastering coding: if the perforated tape snaps, he can restore it. Does he plan on studying further? Well, he did graduate from a night tekhnikum, now the wife has enrolled, they could not have done it together, too much of a strain. And there's no need. He likes his job, is good at it, what else can you wish for?

What I wanted to know most of all was the attitude toward this machinery of the workers themselves. Weren't they sorry to lose their skills?... Programming devices of the next generation were being demonstrated by Muscovite Viktor Timakov. Previously an assembly worker, he was a paratrooper in the army, has 45 jumps to his credit. A handsome lad, quick on the uptake and, I suspect, a bit on the venturesome side.

The new microprocessor is built into the machine. It is fed information off a keyboard. Timakov's fingers raced across the keys with an effortless grace bordering on showmanship. "Writing" the program, he did some computing on a pocket calculator, but all the serious mathematics are encapsulated in the machine. For example, he sets the screw thread pitch and length, the number of transitions and the optimal regime are selected by the machine itself.

Is mastering this profession easy? He replied that he'd already trained 10 people. All young fellows out of the army or vocational school. Is a secondary education sufficient? Quite. Why, take himself--he'd stuck it out in night classes in an institute up to the third year, but quit: combining school with a full-time job was tough and he had no intention of changing professions anyway. The widespread belief that engineers are needed everywhere is just idle talk.

Which is better, the microprocessor or the "box"? I was positive Timakov would defend his machine to the hilt, but he said the column has one advantage too. Like what? Well, you can't make perforated tape spin any faster. The program there is ironclad. But in my machine it can be changed. At the end of the month or quarter someone will surely want to overfulfill the plan at the expense of the technological process or product quality. But then, entering a correction, if you use your head, is an interesting assignment.

We talked in the shop, later in Timakov's cozy two-room apartment where he lives with his wife and little daughter. Okay, I concede, he's an adjuster, that's creative work. What about the people who operate the machines? Timakov had given it some thought: even today most turners are "operationists" churning out the exact same gears, flanges and the like. The numerically controlled machine tool frees them of this monotonous toil. Anyway, real all-rounders are flew and far between, in fact, there's a catastrophic shortage.

So this I came to realize--the stars of the trade need feel no anxiety. There'll always be work for them. There'll be individual assignments and first samples which, by the way, you need to put a program together. Of course, skill, when not used, fades away. The most amazing aspect of Chkalov's flight to America

over the North Pole was that for 63 hours running the pilots never let the wheel out of their hands. Today this would not be necessary: there are automatic pilots. And none of the airmen seem saddened by the fact.

Old skills fade away, but new ones come to take their place, and another breed of star performers is born, but craftsmanship itself is indestructible. I liked the way these two young workers conducted themselves at the exhibition, the way they demonstrated the machines, the way they answered visitors' questions, unfazed by the latter's high positions, always maintaining their own personal dignity.

"The 16-K20," this was Kostin speaking, "is an all-purpose turret lathe. Is it a good investment? Judge for yourselves: a new one, of similar capabilities and also with numerically controlled machine tool, costs 32 thousand, our machine--20 thousand."

"Well, if you have to buy, it is better to buy a brand-new one," parried one of the ministers.

"If the money is not yours," said Kostin, "it is."

Technologically speaking, the problem may be considered solved. By the end of the current 5-year period "Soyuzstankoremnaladka" will be renovating 600 machine tools a year. But there are in all (only the models selected and only those subject to modernization) 60 thousand of them. The arithmetic is simple: this little chore will take a hundred years!

What, then, can be done about it? One variant is to develop the "Soyuzstanko-remnaladka" association. The association does not have a single affiliate east of the Urals, and do you know how much it costs to haul a machine tool from Vladivostok to Moscow? Moreover, modernization is a permanent fixutre. One mustn't imagine that you give it one shot and that's all there is to it. Somebody estimated: to work at it on a continuous basis, to deliver the machinery to the client as good as new, 40 more repair plants will have to be built. This is not done in a day.

Another way is to hand the projects over to the ministries and let them do the job themselves. Every one of them has repair shops which are quite up to the task. This, though, will entail a sharp increase in the production of standard assemblies and programming devices, something that cannot be achieved through amateur effort alone. Materials will be needed and allocations and funds, modernization will have to be included in the ministries' plans (beginning with 1984 would be fine, no sense in putting it off) in such a way as to make their fulfillment an attractive proposition--which way is shorter?... At this point it would be appropriate to quote an excerpt from Yu V. Andropov's speech at the June (1983) plenum of the CPSU CC:

"To work out a system of organizational, economic and moral measures that would encourage managers, workers and, of course, scientists and project engineers to renovate old machinery and render unprofitable all work done the old way--this is our task."

I have not yet had the opportunity to mention that there was a Soviet-Yugoslav system called "LYUMO" on display at the exhibition, a little bright-paneled briefcase which could read, memorize and actually see the microscopic points on its glass rules. It operated in a "ship's pilot" mode, showing the worker where to direct the tool and when to withdraw it, even beeping in the process. I felt a bit uneasy over this subordination of man to machine, but most operators, I was told, work with the "LYUMO" willingly. Young lads quickly attain hairbreadth precision, a once rare ability that took dozens of years to master. Productivity rises sharply, but the most impressive feature of the device is that the modernization itself is made easy--it is done on the spot in one day.

The time has come to carefully weigh all the variants. The time has come to really bring economic levers into play. So that the money plants pay for their equipment becomes their "own." So that they do not but anything needlessly, but having once done so, use it to the full. So that they push and shove to get some new machinery.

"We haven't found our way to that yet," I was told by L.N. Snovskiy, chief of the Machine Tool Building Department at Gosplan. "The pressure on the machine tool market is enormous, all we hear from just about everywhere is "Give us...!", but most orders are for old models, the numerically controlled machine tools are the last on the list. Of course, "we need mamas of every kind," but why this disparity? Because nobody has yet suffered financially from equipment downtime. We did try to levy 6 percent payments on fixed capital, but right then and there incorporated the amount into each enterprise's plan so that it would have the wherewithal to pay."

The science of economics, as we are wont to say, is in arrears. Truly in arrears: there is no fundamental research, no recommendations to help industrial managers find their way. And diletantism in any field brings nothing but harm. Here and there, in pursuit of the latest trend, they've taken to dispersing their numerically controlled machine tools--one here, another there, but the economy of labor thus achieved is imaginary. The operator may be set free, but more engineers, electronics specialists and programmers will have to be brought in.

I paid a visit these days to ENIMS [Experimental Scientific-Research Institute of Metal Cutting Machine Tools], the scientific nerve center of our machine tool building, and the institute's director, V. S. Belov, strongly emphasized: the new machines fit beautifully into the brigade method of work. They require smooth administration, planning and supply. Chaos does not lend itself to automation. Using the numerically controlled machine tools for one shift only is obscene. Concentrated in a technological cluster, they perform impecably, but scattered all over singly or in pairs they stand idle and discredit the whole idea.

The less you know, the simpler everything seems. Embarking on such a major undertaking, we must look far ahead. To invest such enormous sums and not get a full return is a load even the state cannot carry. Moreover, in addition to what has already been mentioned this machinery requires maintenance, prompt and efficient servicing of automatic lines and machine tools equipped with ChPu. You cannot have machinery worth scores of thousands of roubles coming to a stop for want of a two-kopeck electronic gizmo.

Reviewing the exhibition, I am happy to report that its organizers considered this aspect too. There is a "UAZ" minibus parked in a corner and it is chock full of instruments, tools, electronic plates--emergency medication for the new machinery. And hanging beside is a map of the USSR which depicts with great accuracy the "branch base centers" planned for the future. These will service the industrial plants of entire rayons, they will fix any breakdown in 24 hours.

Let's be frank, the creation of such a network will cost, but without it the entire project makes no sense. Whatever the sums involved, though, they are immeasurably less than the price of unemployment for millions of machine tools. The map, I realized, recorded the dreams of sensible people, it is, in a manner of speaking, a fantasy. But the exhibition in Karacharovo, on the outskirts of Moscow, once again convinced me that fantasy is no obstacle to business. Dreams do not clash with efficiency. Inertness does.

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BRIEFS

PLANT EXPANSION--Our collective, like the Sukhumi Experimental Gas Devices Plant discussed in EG No 30, is in a stretch of retooling and mastering new equipment. In recent years, 34,000 m^2 of new production space has been built. Four shops have been put into operation and two have been expanded. Five hundred special and unitized machine tools were installed in them. They have picked up speed precisely on schedule. Well thought-out preparation and initiative helped us. We previously had a small group of repairmen in the chief mechanic's department. Given the large amount of equipment arriving, it naturally was "swamped." Shop repairmen groups were created on the initiative of workers in the No 1 mechanical assembly shop. Such groups are now operating efficiently, with a good return, in all the main shops. As at the Sukhumi plant, we have had quite a few difficulties, especially when the necessary activeness, persistence and enterprisingness has not been displayed. There has been considerable trouble, in particular, in the No 2 mechanical assembly shop, which is in the midst of renovation. Numerical-control machine tools available in the plant often stand idle due to a lack of spare parts. The Ministry of Machine Tool Industry has been slow to solve this problem. [By A. Vorobyev, director of the Chelyabinsk Machinebuilding Plant of Automotive-Tractor Attachments] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 83 p 8] 11052

UNDER-PRODUCTION CITED--In the first half of the year, the "Elektrotyazhmash" plant in Kharkov failed to produce dozens of machines planned for. The socialist obligations assumed early in the year remain unactualized. The "Kharkovmetallosnabsbyt" board (chief, N. Kosenkov) permitted an unpardonable mistake by ordering the wrong rolled metal for the plant from metallurgists. A feverish search for the right metal sections began in various places. In the end, a larger-sized rolled product was found at the "Elektrotyazhmash," causing extra expenditures on machining. The "Barrikady" plant in Volgograd also let us down by being late in supplying forgings and GPZ-1 failed to supply all the bearings ordered from it. There was idle time at two foundries kept on "starvation rations" by interruptions in deliveries of oxygen and nitrogen from the Kharkov Oxyacetylene Plant (director, A. Shekhovtsov). Lack of discipline among suppliers negatively affected work results at "Elektrotyazhmash." However, the plant's own economic leaders did not do everything they could to prevent the downfall. Serious shortcomings in production organization and in the use of material resources were criticized at a recent plenum of the party gorkom. The facts show that the plant can repay the debt in the second half of the year. Thus, one turbine generator has already been shipped out to a customer, and a second is being shipped out in August. [By N. Gubenkov (Kharkov)] [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 83 p 4] 11052

STATE FUNDS FOR CAD--On the review "Automation in Scientific Research and Planning" (No 33): All aspects of the review touch the interests of scientific and design organizations of the Ministry of Machine Tool Industry. The difficulties in introducing automated planning systems were correctly noted. The Ministry of Machine Tool Industry supports the review's proposal that a state algorithm and program stock (GFAP) be created for automated planning systems, permitting a reduction in the time involved in developing SAPR through the use of system and stock programs. [By G. Boym, deputy technical administration chief, Ministry of Machine Tool Industry] [Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 83 p 2] 11052

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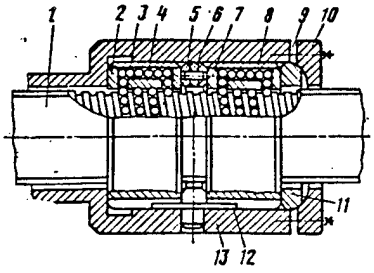
BALL-SCREW FEED SYSTEM OF NC MACHINES IMPROVED

Moscow MASHINOSTROITEL' in Russian No 9, Sep 83 p 18

[Article by Candidate of Technical Sciences V. F. Krasnikov and engineer V. D. Miroshnichenko: "Improved Feed System"]

[Text] The precision and quality of parts machining on NC machine tools depend significantly on the operation of ball-screw transmissions (ShVP) in machine tool feed and drive systems. The main shortcomings in such transmissions are imprecise clearances which increase during operation, caused by ShVP design and the forces operating within the system, as well as link expansibility, and open return passages for rolling shafts, creating a danger that they can drop out and be lost in the course of preventive maintenance and cleaning.



In order to eliminate these shortcomings, the ShVP was improved: a regulating snap ring (6) was installed between movable half nuts (2) and (7) to eliminate or minimize the clearance, as well as deflection plates (3) and (8) to prevent spontaneous dropping of bearings (4) out of the return passages. Ring (6) is in the form of two half-rings (5) connected to the axle by ball-bearing. The deflection plates are screwed into half-nut sockets set into housing (13) of spline (12). The half-nuts and snap ring are secured rigidly to the housing by cover (10) and spherical insert (11) tightened by screws (conventional depiction). As a result, it is no longer necessary to have a gasket in gap (9) for pretightening.

When screw (1) is turning counter-clockwise, bearings (4) interact between its surface and half-nuts (2) and (7), creating an end thrust P_o which does not exceed the tightening end force of cover (10). Value P_o is generally given. If it is not, but one knows circumferential force Q, it can be found using formula

$$P_o = \frac{Q}{tg(\alpha \pm \rho)} \quad ,$$

where α is the pitch of the screw thread and ρ is the friction angle.

These relationships ensure constant contact between the surfaces of the parts, which guarantees a constant clearance tightness and stability of ShVP operation. In order to regulate the size of the clearance tightness, we determine the actual clearance in a pre-assembled transmission. We then renove cover (10) using screw (1) and push half-nut (7) and ring (6) out of the housing. Bearings (4) are held in place by deflection plate (8). Half-ring (5) is ground to a size ensuring ShVP operation without a gap. Using screw (1), the ring and half-nut are then put in the housing (13) and the cover (10) is tightened.

Use of this improved ShVP will increase the precision and operating reliability of machine tools.

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STATE OF FLEXIBLE MANUFACTURING SYSTEMS IN WEST SURVEYED

Moscow MASHINOSTROITEL' in Russian No 9, Sep 83 pp 43-44

[Article by V. G. Lepikov, candidate of technical sciences: "Trends in Development of Flexible Automated Production Facilities"*]

[Text] The generally accepted new directions in automating series production are the creation and introduction of flexible automated production facilities (GAP) at various levels of integration. The following may be separated out in their development: flexible production cells; robot-technological complex; flexible production systems or comprehensively automated machine tool systems; flexible automated sections; automated shops; automated plants.

Flexible production cells (GPYa), as a rule, include one machine tool with ChPU [Numerical Control] that interacts with a materials handling device, an intermediate product and product storage device, a tool magazine, a device for automatic tool change, as well as auxiliary equipment to provide normal operation of the machine tool. A great amount of experience in introducing flexible production cells was accumulated in the GDR. Their basic purpose is the automation of small series and unit production if the number of machined parts is greater than 20. Such cells have different levels of automation: they may be serviced by an operator (low level), but permit operation without service personnel (highest form). Experience is available on operating GPYa in the 3/2 mode in which the equipments operate for three shifts, but it is serviced in two shifts. In the future, the GPYa will operate in the 3/1 mode in which servicing will be done only during one shift.

The robot-technological complex (RTK) consists of one or several technological machines, united by a single cycle in which all auxiliary operations on transferring and fixing intermediate and semifinished products are done by one or several industrial robots equipped with peripheral monitoring-information devices. At present, RTK are used widely for automating stamping, welding, painting, etc. On the basis of the analysis of the experience of a number of firms in the United States, a conclusion may be made that by 1990 arc welding

* According to information from abroad.

will be done at these enterprises primarily by the RTK while the number of welders will be halved. The use of RTK and industrial robots will reduce by 90 percent. The numbers of workers in operations for treating surfaces and applying paint and varnish coatings. According to similar forecasts for 1995, about 20 percent of the assembly work in the industry in the United States and Japan will be done by special RTK.

Flexible production systems (GPS) or comprehensively automated machine tool systems (KAS) have developed widely at present. They consist of program-controlled easily readjustable basic technological equipment, devices for manipulating intermediate products and tools and interoperational transport systems. At the start of the eighties, there were 67 such systems in the world. Their flexibility varies. The number of kinds of products processed by each system varies from 6 to 11. About 85 percent of all KAS include from 2 to 15 machine tools. The automation level of the information systems used in KAS and GPS varies. Control computers are not used in four KAS.

On the scale of using GPS and KAS among capitalist countries, Japan is in the first place, the FRG in the second and the United States in the third. Efforts of American specialists are directed toward the creation of promising progressive types of equipment and methods for using KAS. In this connection, a new direction originated in machine tool building -- the development of a modular type with a changeable structure for the GAP machine tool. It is forecast that in ten years, the demand for GPS and KAS will increase annually by 25 percent.

In spite of the efficiency of using KAS and GPS, their utilization is not the final solution of all series production problems. A new step in automating series production is the creation of an integrated system that spans the stages of automated product design, the development of technology and the production of the product. Such an approach is a decisive one for the majority of American companies in the very near future.

In the very near future, the basic direction in the development of production automation will be the creation of automatic sections and shops with DNC type control systems using multioperational and other types of machine tools with ChPU of the CNC type. In this connection, of interest is the experience accumulated in Japan, FRG and other countries on creating and using flexible automated sections (GAU). The automation level of the section makes possible its unsupervised autonomous operation. The English Neilt Tools Firm has an automated section for machining ratchet gears at its plant. With its introduction, the unfinished work-on-hand decreased by half. The firm plans the expansion of the automated production facility by using the principles of group technology.

The next stage in the GAP development is the creation of automated shops for small series production. In 1982, the Renault Vehicules Industrie Firm put in operation at its plant, the first in France, automated shop with an area of 3000m^2 for manufacturing housing for gear boxes of three type-sizes. Production operations are fully automated. The shop equipment includes boring and planing machine tools, modular devices, transport facilities and

parts for conversations between operators. A central computer coordinates the operation of the entire system. Each module can operate independently of the general automatic system.

Typical automated sections and shops include machine tools with ChPU, control systems, and systems for searching and storing data. However, they do not allow the full utilization of the potential possibilities of the GAP for raising the productivity of labor because the existing intraplant facilities for transporting materials and parts do not meet automation requirements.

The development of technology and the expanding possibilities of computers create favorable conditions for building automatic plants for series production. The attention of leading firms in Japan, the United States and Europe is attracted to the problem of organizing a plant of the very near future in which the ideas of technology without people being present may be realized.

The Japanese Yamasaki Firm announced the putting in operation of an automatic plant in which machine tool parts are being machined; the Fanus Firm (Japan) put in operation an automated plant (with an area of 2000m^2) with flexible readjustable production facilities and a technology without using people, applied in machining shops. There are about 100 operators at the plant in the day shift and only one operator at night. The productivity ratio between the day and night shifts is 1:1. Every month one plant manufactures 100 machine tools with ChPU, 100 electric erosion installations and 50 robots at a total cost of 40 million francs. The cost of the plant is 180 million francs. As compared to an unautomated production facility for the same production program (for an enterprise cost of 140 million francs), the additional costs will pay for themselves in three years because the equipment yield is greater by 1.5 times and the output per worker increases five-fold.

Specialists in the majority of developed countries, according to investigations and analysis of development of equipment with ChPU and computers, plan the creation, in the long-range, of (up to 2000) fully automated industrial enterprises. According to preliminary data, the number of workers in the United States will decrease by 2000 to 2-10%.

One of the trends in the GAP development is the creation of control systems that provide the means for diagnostics and the adaption of the structure to various tasks, as well as special devices for repairs.

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MODULAR APPROACH TO FMS IN COMMUNICATION-ELECTRONICS PRODUCTION

Moscow MASHINOSTROITEL' in Russian No 7, Jul 83 pp 16-17

[Article by engineer A. M. Voychinskiy: "Standard GAP Modules"

[Text] The rapid development of computer equipment and the improved reliability and lower cost of NC machine tools have permitted the comprehensive automation of small-series production, in radio engineering industry in particular. The branch makes extensive use of the series-produced and centrally supplied "Gnom," "Mars," "Kontur," RF-201, RF-202, RF-204M and other industrial robots in the production of radio-electronics devices.

Development of a flexible automated production facility (GAP) plan generally begins at branch enterprises with the development and building of fully automated lines, sectors and shops, which are introduced in stages. The efficiency of organizing shop production as the smallest but most independent plant subdivision is revealed at this stage; unified computer equipment is chosen and unified transport-materials flows are calculated. In this regard, it should be borne in mind that the unitized-modular principle of setting up sectors, transport-warehousing flows, the organizational-economic management system, as well as the staged start-up of capacities is a prerequisite for introducing GAP's when renovating or retooling a plant without fully shutting down.

Machining comprises a third of the total labor-intensiveness of manufacturing items at a radio-electronics devices production facility. We anticipate only an insignificant decrease (to 25 percent) in the labor-intensiveness of machining devices in the future through the use of more progressive materials and by changing over to a new element base. GAP developers are therefore paying much attention to the design of standard structures in machine shops. In this regard, an adjustable unitized machine tool, NC machine tool or processing center will be unified by an overall control system and transport-storage system. GAP modules will be designed with a view towards maximum equipment versatility, ensuring considerable flexibility in machine tool reprogramming and a minimum number of repositionings of parts being worked.

A diagram of a GAP module for rotating-shaft types of parts weighing up to one kilogram is shown in Figure 1 [following page], in which (1) is the system for collecting ready parts, (2) is the apparatus linking the NC machine tool with the module control system, (3) is an RF-204M industrial robot, (4) is an

Figure 1.

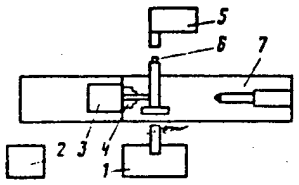
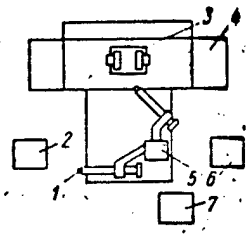


Figure 2.



adjustable holding device, (5) and (6) are loading and clamping devices, and (7) is a TPK-2125VM machine tool. A diagram of a GAP module for body parts weighing up to one kilogram is shown in Figure 2, in which (1) is the grasping device, (2) is the storage device, (3) is a pneumatic clamping device, (4) is an LF-260 MF3 machine tool, (5) is an RF-204M industrial robot, and (6) and (7) are devices for receiving finished parts and connecting the NC machine tool with the module control system, respectively. It is appropriate to use such modules for machining a specific group of parts. Enterprises are therefore faced with the task of introducing flow-line production methods based on grouping and standardizing the parts being machined. The organization of comprehensively mechanized and automated production on a base of standard flexible automated technological modules (especially when creating scientific-production associations) must be accompanied by a system approach, a comprehensive approach, to their control.

In recent years, fundamentally new and promising forms of control -- target-program structures -- have come into widespread use. The most preferable sphere of their use is work aimed at creating and introducing into production high-technology items and the replacement of existing technology with progressive, more productive and low-waste technology, at enterprise retooling and renovation, at improving output quality, and at designing and mastering the production of automated technological process control systems for all types of production facilities and of automated enterprise management systems. At the same time, we need to raise the level of control systems for tool, mechanical repair, power and transport production services, labor organization, product quality, as well as systems for recording, stimulating and setting rates for labor, for training and improving the skills of personnel.

11052
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ROBOT INSTALLATION, INTEGRATION PROBLEMS RECOUNTED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Nov 83 p 2

[Article by V. Kazarezov, head of the Machinebuilding Department, Novosibirsk Oblast Party Committee: "Where the Robot Stumbled"]

[Text] By the beginning of 1981, dozens of manipulators were already in operation at different enterprises in Novosibirsk City and oblast. For this reason, when we started with the realization of the program of the extensive introduction of robots envisaged by the resolution of the CPSU Central Committee, we first of all tried to generalize accummulated experience and precisely determine on this basis what should be continued, what should be undertaken anew and what resources there are for this purpose. A special council for robototechniques, established under the oblast party committee and consisting of scientists, technologists, chiefs of departments of large factories, and party and Komsomol activities, helped us cope with this task.

The council concentrated its attention on all enterprises without exception, all main technological labor-consuming processes, as well as on the studies of plant specialists which help to shift such operation onto the shoulders of the manipulators. Unfortunately, it turned out however, that there are many more "bad" factories in regards to the use of manual labor than opportunities to help them. For this reason, in order to obtain an appreciable return from robotization, the council recommended the concentration of specialists' efforts and available assets on 24 enterprises and the introduction there of 500 automatic manipulators in the current five-year plan period.

These proposals were assumed as a basis for a comprehensive program, which was approved by the bureau of the oblast party committee. The city and rayon party committees, with the help of their councils, took control of its implementation right away. Special design and technological bureaus, laboratories and groups for the introduction of robots were established at the enterprises.

As a result of this activity, in just the first 2 years of the implementation of this program industry obtained approximately 200 mechanical helpers instead of the 167 projected at the beginning. The accelerated rate allowed the revision of the former rough draft and the setting of a new goal--the introduction into production of not 500, but 700 robots by 1985.

What sort of return has there been from this work?

First of all, good results were achieved where we succeeded in uniting the manipulators into whole complexes and creating production lines and sections where man was not needed at all. For example, at the Berdsk radio plant three dozen robots produce most of the parts used in the apparatus smoothly and without interruptions. There are plans to start up several more such lines here soon and to bring the number of robots up to 75.

The progressive technique also proved itself at other mass production enterprises. The experience gained, however, revealed a lot of problems which limit the rate of its introduction into production, bring down and sometimes reduce to zero the expected economic saving. So, where and why does the robot "stumble"?

The very joining of the manipulator and the machine-tool or machine formerly operated by man becomes the first threshold. In order to create "harmony" in this new family, the designers, fitters, and adjusters have to expend more than a little labor.

The major trouble is that the robots come into the shop quite "naked," without having even the minimum of the necessary accessories--clamp systems, feeder bins, storage units, etc. The workers of the appropriate enterprise are compelled to build them themselves, "squeezing" the pressing orders for parts and units into the already co-ordinated shop plans. The laboratory of the robototechnical complexes at the association Electroagregat was designated such a completing section. At other enterprises, the "equipping" occurs immediately in the shops with long stopages of the equipment and searches for optimum solutions. This "clothing" costs up to 40 and even 90 percent of the cost of the whole robototechnical complex.

Even after these difficulties and troubles are past, there is still no guarantee that the progressive technical equipment will produce the expected effect. For example, take the following incident from the Sibelektroterm Association.

The machine-tool builders of the Production Association imeni Sergo Ordzhonikidze in Moscow provided the Siberians with an automated shaft turning line at a cost of 350,000 rubles. Its installation and adjustment lasted from 1980 right up to recent times. However, this unique complex was not a source of joy for the enterprise: first, it turned out that only 10 percent of its power could be used, and, what is the most important thing, it is not suitable for centering, milling, grinding and some other operations necessary for full production of the shafts. In the end, the Sibelektroterm workers felt compelled to set up a section with a complete set of equipment for all operations. And among them only one is automated, the turning. As they say, the mountain brought forth a mouse!

This case makes us meditate upon many things. And first and foremost that the Ministry of Electrotechnical Industry should have considered this from the very beginning: is it really necessary to deliver such a highly productive line to the Sibelektroterm Association, where there is not a great need for

shafts? Wouldn't it be better to build a completely automated complex at one of the enterprises and to manufacture such parts on one production line? If the remaining operations still cannot be robotized, should the expensive manipualtors be used only for turning? You see, in the end the saving gained here will be completely lost at subsequent stages.

Today it is quite evident that the robotization of production certainly demands a comprehensive approach. One of its concrete manifestations is the design of machine-tools with built-in robots and a single numerical control system. Such a complex based on a multicutter semiautomated lathe and a floor installed robot is now being prepared for production at the Novosibirsk Machine-Tool Building Plant imeni XVI parts"yezda. Mass production enterprises are already placing orders for this equipment.

The Siblitmach plant has produced robotized pressure-die casting complexes since the beginning of the five-year plan period. Portal robots for numerical control lathes developed by the Novosibirsk Affiliate of the Orgstankimport Institute have won awards at the USSR Exhibition of Achievements of the National Economy. Transport and storage robotized systems, production sections with robots for stamping parts are being originated at the Scientific Research Institute of Comprehensive Electric Drive of the Electroagregat Association.

Robots, robots, robots.... Their place of birth--Novosibirsk. How many of them are designed in Moscow and Leningrad, Sverdlovsk and Kiev, Minsk and Rostov? During the last five-year plan period alone about 100 models were created. Who mastered their production? Did planning and design collectives and enterprises in which the robot engineering was concentrated appear in the sectors?

Obviously not. Otherwise, why would the designers of the plant imeni XVI parts"yezda "have invented" the 101st model and search for solutions for "Siblitmash"? Wouldn't it be simpler and more economical if the same Ministry of Machine-Tool Industry, which has a robot building center, provided its enterprises with selected designs and organize cooperation between them and the machine builders of other sectors?

We think that it is time for changes of this kind. In order to speed up the introduction of robots and to increase their return, it is first of all necessary to limit the number of models being created and to put a stop to parallelism in the work of design sub-units.

It is also worth thinking about whether it is necessary to at this stage to strive for the production of a larger number of robots resulting in "editions" of robots arriving at the contractors "naked." It is evident that positive results can be obtained both faster and more fully if the manipulators are supplied together with the appropriate equipment. Generally speaking, it would be better if the enterprises receive robotized equipment and robotized complexes from the beginning.

It would be also proper if, in the planning of new production plants and new processes, flexible automation is foreseen from the beginning based on the concentration of the latest equipment of this type rather than on the use of individual robots. The philosophy of some of today's leaders responsible for the introduction of robots--"not to be worse than others"--is only to the detriment of production.

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